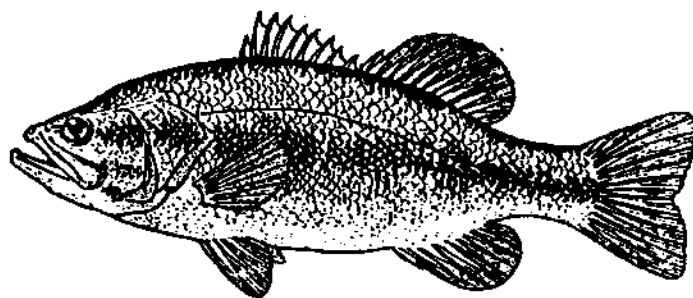


****ATTENTION****

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WHAT THE HECK IS THAT?

Common Parasites and Diseases in Washington Game Fish

IT'S A NATURAL FACT

The sun is low, the water is still, and the evening bite was hot. No Campbell's Bean with Bacon around tonight's campfire! But wait a minute—this fish is "grubby." Does that mean dinner's off?

Not at all. Parasites and bacterial infections are usually more damaging to the angler's sense of aesthetics than they are to the fish itself. The fact is, with proper preparation, most affected fish can be eaten without concern.

Diseases are fairly commonplace in fish populations. Parasites and bacteria are a natural part of the ecosystem in which fish live. Lake fish are especially susceptible because of warmer water temperatures and the abundance of other organisms through which disease may be transmitted.

Most parasites spend only part of their lives in fish. Birds, snails, plankton, and even mammals may "host" a parasite at different stages of its life. Parasites go through as many as six different stages from egg through the larval stages to adult.

Anglers may notice that some symptoms follow seasonal patterns or other cycles. This situation is especially noticeable when parasites are passed to fish through migrating birds.

Most fish disorders are classified as parasitic, bacterial or viral. Sport fishermen are most likely to come into contact with fish affected by parasites or bacteria. Viral infections like IHN (*infectious hematopoietic necrosis*) are usually detected at the hatcheries while fish are still at the fry stage. Diseased fish are destroyed. Wild fish with viral infections are generally weak and unlikely to bite, so natural predators catch these fish before "sport predators" do.

The following information on parasites and bacterial diseases is for the curious, but cautious, angler who's not willing to surrender the catch of the day to a few worms.

Extra care should always be taken when handling affected fish, but in all but the most severe cases, proper freezing and/or cooking will make your catch safe to eat. If you're more hungry than curious, skip right to the end for information on how to safely prepare affected fish.

PARASITES

Parasites can be broken down into two categories: internal and external. Internal parasites are found in the muscle tissue, eye, under the skin, and in or around the internal organs. External parasites are most often found attached to the outside of the skin, fins, or gills of fish.

INTERNAL PARASITES

YELLOW GRUB (*Clinostomum marginatum*)

The yellow grub is one of the most common North American parasites. Although it infests a variety of fresh water fishes the yellow grub is rarely found in trout species.

The 1/4 inch long grub is flat and encased in a cyst just under the skin in the muscle where it forms a wart like bump. These bumps are often visible at the base of the fins and tail. These active worms make quite an impression when they pop out of a fish fillet headed for the frying pan. On other occasions, they may be found on the gills.

BLACK SPOT OR BLACK GRUB (*Uvulifer ambloplitis*)

Larvae of yellow and black grubs are most noticeable in fillets of white-meated fish. Infection from the larvae creates small, raised black spots which look like pepper in the skin and the flesh. The tiny larvae themselves are white, but the fish produces a black pigment that surrounds the thick-walled cysts.

Skinning infected fish will remove most grubs as the majority of cysts occur in the skin.

EYE FLUKE (*Diplostomum spathaceum*)

These flukes seem to be most abundant in rainbow trout but also occur in other species of trout and in bass, bluegill and other warm water fishes.

The fluke occurs only in the lens of the fish's eye. A "popeye" effect is sometimes created from accumulation of fluids in the eyeball. In advanced cases the eye becomes opaque white and the fish becomes partially or totally blind.

BASS TAPEWORM (*Proteocephalus ambloplitis*)

The bass tapeworm can be very damaging to freshwater fishes. Largemouth, smallmouth and rock bass are the most susceptible species; the bass tapeworm is not transmissible to humans.

Although the adult tapeworm looks serious—with lengths up to two and a half feet—the larva actually do the most damage to the fish. Larvae invade reproductive organs and can cause sterility in the fish.

Bass tapeworms will be most evident in the fish's intestine. In heavy infestations, internal adhesions may be so great that the intestines, liver, spleen and reproductive organs are bound into a single mass by a mat of connective tissue.

TROUT TAPEWORM (*Diphyllobothrium spp.*)

The larvae of this tapeworm appear as white cysts in the abdominal organs and body cavity of trout. When heavily infested, trout become listless and swim lazily near the surface.

Fish only host the larvae of this parasite. Adult trout tapeworms are found in birds, dogs, cats and bears. Several species of

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Diphyllbothrium are infectious to people. It never hurts to wear gloves when cleaning fish, or at the least, protect any cuts and wash your hands thoroughly after handling fish.

SPINY HEADED WORMS (*Acanthocephala*)

Various species of this small worm are found in almost all the fresh water fishes. Spiny-headed worms, usually no longer than 3/8 inch long, are most often found imbedded in the intestine. They are easily identified by their round bodies, they can be white or pale yellow, but are often a bright orange color, and tube-like snout which is covered with spines. The spines are actually hooks the parasite uses to attach itself to the fish.

ROUNDWORMS (*Nematodes*)

Roundworms can be identified by their round elongated bodies and lack of segmentation or suckers. Most roundworms pose little danger to humans, but the kidney roundworm, found in bullheads and northern pike, may be transmitted to humans. Thorough freezing and/or cooking will greatly reduce the possibility of parasite transmission.

Red Roundworm (*Eustrongylides*)

Red roundworm is one of the most common of the nematodes, or roundworms. This parasite will be found in many species of fish including largemouth and smallmouth bass, walleye, sunfish, rock bass, crappie, yellow perch, pickerel and eels.

Redworm larvae is found in the fish's flesh and internal organs and is easily recognized by its deep red color. Occasionally, the infestation is so great the fish can't be salvaged to eat. They are infectious to people.

White Roundworm (*Philonema*)

These small, white, threadlike worms are about one to one and a half inches long. White roundworms are found in the air bladder or free in the body cavity of various trout species.

EXTERNAL PARASITES

COPEPODS

Copepods are among the large group of tiny aquatic crustaceans. Abundant in both fresh and salt water, they form an important part of the food chain for fish and plankton-eating marine animals. However, some copepods have turned the tables and adapted to life as a parasite.

Two of the most commonly seen parasitic copepods are fish lice and anchor worms.

FISH LICE (*Argulus*)

The seventeen known species of fish lice have been found in almost all warmwater and anadromous fishes. (Anadromous fish spend part of their lives in fresh water and part in salt water.) At first glance, fish lice look somewhat like scales but are actually saucer shaped on closer inspection. The lice sometimes have jointed legs and two disk shaped "suckers" which are sometimes mistaken for eyes.

The lice, usually 1/8 to 1/4 inch long, can creep over the surface of the fish and are found attached to the skin, fin or gills.

ANCHOR WORMS (*Lernaea* spp.)

When fishermen complain of "wormy" or "grubby" looking fish, they're often referring to an infestation of anchor worm. The parasite is about the size of a grain of rice, is yellowish white, and is found primarily in the gills, mouth or fins of trout. The head of this copepod is buried in the flesh with the remainder of the worm hanging from the wound. When the copepod dies and falls off, the inflamed wound may be left.

OTHER EXTERNAL PARASITES

LEECHES (*Hirudinea*)

Although not very common in Washington, leeches are sometimes found attached to freshwater fishes.

Leeches somewhat resemble flukes, but on closer inspection leeches appear segmented and have suckers at the head and tail end.

Leeches have no effect on the quality of a fish's meat.

ICH (*Ichthyophthirius*)

Ich is most common among the warmwater species but can also be found on salmon and trout.

Period-sized grayish-white swellings or elevations on the body and fins are prominent signs of ich infection. The swellings are usually well defined but in cases of heavy infection may appear as irregular, light-colored patches. Similar lesions may occur on the gills, but these are harder to see.

FISH FUNGI (*saprolegniasis* or *saprolegnia*)

Physical injury or infection stemming from invasion of other parasites provides the initial foothold for this fungus.

The fungi appears as one third of an inch or longer cottony patches, white or off-white in color, growing on or out of the fish. Threads may appear gray or brown if the water is muddy. Fish fungus can occur both internally and externally, usually growing in small patches but spreading in later stages.

BACTERIAL DISEASES

In most bacterial infections, affected areas can be cut away and the rest of the fish eaten after thorough cooking or freezing. However, if the infection is extensive or the fish has a puffy body and swollen eyes (dropsy), the meat should not be eaten.

FURUNCULOSIS

In 1894, Furunculosis became the first bacterial disease to be scientifically described. The bacteria attacks salmonids, principally fish 2 years or older. Brown and brook trout are particularly susceptible. Cutthroat trout are also affected but rainbows seem resistant to the Furunculosis bacteria.

The most common symptoms of furunculosis are ulcers and boils around the dorsal, or top, fins. The ulcers may be tinged with blood and larger ones contain a sticky, dark-reddish pus. Hemorrhages may also be seen in the eyes and on the fins. Gills may be white or pale pink and occasionally soft blister-like lesions filled with blood form just beneath the skin.

Internally, there may be bloody fluid or inflammation around the heart and red spots in the body cavity.

COTTON WOOL or MOUTH FUNGUS DISEASE (*Columnaris*)

Columnaris is widespread among the freshwater fishes, affecting spiny rays and catfish as well as trout. The common names are misleading because the infection is due to bacteria rather than to fungi. Outbreaks occur most often when water temperatures are above 55 degrees F.

The disease shows up as gray-white spots on the head and fins although gills and sides of the body may also be affected. As the disease progresses the spots progress into small circular lesions and the fins become frayed. Yellowish slime may cover tissue exposed by the lesions.

Common Parasites and Diseases in Washington Game Fish

IMPERFECT IS NOT A DISEASE

Evidence of parasites or infection in an occasional game fish doesn't automatically mean an unhealthy environment or poor water quality. It also doesn't mean that every fish in the area will be affected the same way. All fish won't be perfect "10s."

Most common North American fish parasites are not harmful to humans but there are a few parasites, including some tapeworms, flukes and roundworms, that can be troublesome to people. It's a good idea to protect open cuts on your hands when cleaning fish. Completely remove all viscera and wash the body cavity, taking care to remove all visible parasites. Most importantly, thoroughly cook or freeze your catch before you eat it.

With the right preparation you needn't give up the grill over a few grubs. Adequate freezing and/or cooking should kill bacteria, parasite larvae—and doubt about safety. But how much is enough? The following guidelines will help you enjoy your catch with confidence:

FREEZING

According to experiments conducted by the FDA, five days in a home freezer set at -4 degrees F killed roundworms in rockfish. As an extra precaution, freeze fish at -4 degrees F for seven days. When the fish is wrapped well and frozen while still fresh, the quality of the meat doesn't suffer. Home freezers often do not freeze fish as low as -4

degrees F. For these freezers it is recommended that fish be frozen for five to seven days to kill the parasites.

Freezing alone isn't an absolute guarantee that all forms of all parasites will be killed. However, when used in conjunction with cooking, hot smoking, salting, kipering or marinating, chances of parasite survival are greatly reduced.

COOKING

Cook the fish until all translucency is gone and the fish flakes completely. Sometimes that's not necessarily the best way to cook fish, but using previously frozen fish will alleviate worries about fish on the rare side.

SMOKING

Contrary to popular opinion, smoking does not preserve fish. "Light-smoked" fish can carry the same risks as raw fish. However, most parasite larvae and bacteria are destroyed when the internal temperature throughout the meat reaches 180 degrees F. The meat must be 140 degrees F throughout the fish, particularly the thicker portions, to kill parasites and must reach 180 degrees F to kill any bacteria. You can still light-smoke fish safely if the fish has been frozen first at -4 degrees F for seven days.

SALTING OR MARINATING

You can't count on the safety of salted or marinated fish unless the meat has been frozen first. Use previously frozen fish in raw and marinated fish recipes.

USE YOUR JUDGEMENT

If the meat smells bad or if the flesh is obviously affected throughout, don't take a chance. Dispose of the fish, taking care the carcass will be secure from scavenging pets or wildlife. "When in doubt, throw it out" is always good advice.

If you have any lingering doubts about the edibility of a fish, or if you would like more detailed information, call the Department of Wildlife Regional Office nearest you.

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(206) 753-5713

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